

Tennessee Valley Authority, Post Office Box 2000, Soddy Daisy, Tennessee 37384-2000

January 25, 2010

10 CFR 50.73

U.S. Nuclear Regulatory Commission ATTN: Document Control Desk Washington, D.C. 20555-0001

Sequoyah Nuclear Plant, Unit 2 Facility Operating License No. DPR-79 NRC Docket No. 50-328

Subject:

Licensee Event Report 328/2009-002, "Manual Reactor Trip Because of Degrading Main Feedwater Pump Turbine Condenser

Vacuum"

The enclosed licensee event report provides details concerning a manual reactor trip and automatic engineered safety feature actuation of the auxiliary feedwater system. The manual reactor trip was initiated because of degrading main feedwater pump turbine condenser vacuum. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A), a condition that resulted in an manual actuation of the reactor protection system.

Respectfully,

Christopher R. Church Site Vice President

Sequoyah Nuclear Plant

Enclosure:

cc: NRC Regional Administrator – Region II

NRC Senior Resident Inspector - Sequoyah Nuclear Plant

I Ea 2 MRR

NRC FO	ORM 3	66	U.S	. NUCLE	EAR R	EGULA	TORY	COMMIS	SION				MB NO.				XPIRES (
(9-2007)																mandatory co the licensing			
				•						indus	stry. Se	end co	mments re	garding	burden estin	nate to the R y Commission	ecords and	FOIA	/Privacy `
		LICEN	SEE EV	'ENT F	RÉPO	RT (L	ER)		1	0001	1, or by	intern	et e-mail to	o infocc	llects@nrc.go	ov, and to the 3150-0104), C	Desk Of	ficer, C	Office of
		(See re			• .	•				Budg	get, Was	hingtor	n, DC 2050	3. Ifai	means used t	to impose an ir	nformation	collecti	on does
			/charac													the NRC may mation collection		ici or s	sponsor,
4 (5 4 6)	LITY		/Citatac	1013 10	Cac	II DIOCI	<u>``</u>			2 00	OCKE	T NILL	MBER		101	DACE			
1. FACI		ıam⊧ ⊩Nuclear	Plant (I (IAO2	Unit 2)				2. DC			00328		3.1	PAGE 1	OF 5		
		- Nuclear	-	JQ14)									~~~						
4. TITL		-	- - 1		- 6 15			4-1- 5-			D	т	·			\			- :
		Reactor								ater	Pum	тр і							
5. E	VENT	DATE	ъ.	LER NU		REV	7. N	EPORT	JAIL	F/	ACILITY	NAME		HEK	FACILITIE	ES INVOLV	DOCKET	NUMBI	ER ·
MONTH	DAY	YEAR	YEAR	NUME		NO.	MONTH	DAY	YEA				,						
11	26	2009	2009	- 00	2 -	00	01	25	201	0 1	ACILITY	NAME			*,		DOCKET	NUMBI	ER
9. OPE	RATIN	G MODE	11.	THIS R	EPOR	T IS SU	вмітт	ED PURS	UANT	гтот	THE R	EQU	REMEN	TS O	F 10 CFR	§: (Check	all that a	apply,) .
			20	.2201(b))		□ 2	0.2203(a)(3)(i)		.[] 50).73(a)(2)(i)(C)	<u> </u>	73(a)(2)	vii)	
	1		==	.2201(d)				0.2203(a)(3)(ii)		Ē	_).73(a)(2				73(a)(2)		A) .
	'		20	.2203(a)	(1)		□ 2	.0.2203(a)(4)] 50).73(a)(2)(ii)(B)	<u> </u>	73(a)(2)	viii)(E	3)
				.2203(a)				60.36(c)(1			<u> _</u>	_).73(a)(2				73(a)(2))
10. PO	WER L	EVEL		.2203(a)				60.36(c)(1)	≥).73(a)(2				73(a)(2)	(x)	Ì
		Ţ		.2203(a)				0.36(c)(2		_	Ļ).73(a)(2				71(a)(4)		. '
	30	, ,		.2203(a)				60.46(a)(3			ŀ		0.73(a)(2				71(a)(5)		
		:		.2203(a) .2203(a)				60.73(a)(2 0.73(a)(2)			_).73(a)(2).73(a)(2				HER cify in Ab ı NRC Fo	stract	below
				.2203(a)	(Z)(VI)									.)(V)(L	') .	or ir	NRC Fo	rm 36	6A '
						12.	LICEN	SEE CON	HACI	FOR	THIS	LER			TELEBUON	IE NUMBER (la alcada Aus	- C1	
NAME	س د														TELEPHON	423-84			"
Donal	a Suu	.O[1	13 COM	DI ETE	ONE	INE EO	R FAC	н сомр	ONEN	TFAI	LURE	DES	CRIBER	INT	HIS REPO				
	I					MANU-		ORTABLE			:					MANU	, R	EPOR.	TABLE -
CAUS	SE	SYSTEM	COM	IPONENT		CTURER		O EPIX		CAUSE	E	S	YSTEM	CO	MPONENT	FACTUR		TOE	
		, 14.	SUPPLE	MENTA	AL RE	ORT E	XPECT	ED					15. EX			MONTH	DAY		/EAR
□ve	<u> </u>			NO [SUBN	IISSIC ATE	ON			-	-					
														A1L					
		nit to 1400 s												_					
		vember																	
	tripped following indication of degrading main feedwater pump turbine (MFPT) condenser vacuum. At																	. At	
ar		approximately 0239 EST, the shift manager was notified of a degrading vacuum in the 2A MFPT									ding v	FPT		,					
	prox	-	0239 E	ST, th			_					_							
	oprox onder	nser. Óp	0239 E eration	ST, th	nuall	y tripp	ed th	e react	or ar	nd er	ntere	d th					_		
pr	oprox onder oced	nser. Óp ures. Ti	0239 E eration ne caus	ST, the ns mai se of t	nuall his e	y tripp vent v	ed th vas d	e react etermir	or ar	nd er o be	ntere the	ed th	sure of	two	isolatio	on valve			
pr le	oprox onder oced vel s	nser. Óp ures. Tl witch on	0239 E eration ne caus the gla	ST, the second s	nuall his e al ste	y tripp vent v eam s	ed th vas d ysten	e react etermir n that ti	or ar ned to rappo	nd er o be ed w	ntere the ater	ed th clos in th	sure of ne leve	two	isolatio vitch an	on valve d indica	ted a	high	
pr le gl	oprox onder oced vel sv and s	nser. Óp ures. Ti witch on steam le	0239 Eneration ne caus the gla vel. W	ST, the second s	nuall his e al ste leve	y tripp vent v eam s el switc	ed th vas d ysten ch ac	e react etermir n that ti tuated,	or ar ned to rappo two	nd er o be ed w asso	ntere the ater ociate	ed th clos in the	sure of ne leve pland s	two el sw seal	isolatio vitch an steam o	on valve d indica drain va	ted a lves fa	high iled	
pr le gl or	oproxonder oced vel so and so	nser. Óp ures. Tl witch on steam le nd allow	D239 Eneration ne cause the glangle vel. Wed glangle	ST, the se of th	nually his e al ste leve al ste	y tripp vent v eam s el switc am to	ed th vas d ysten ch ac be di	e react etermir that to tuated, irectly r	or ar ned to rappo two route	nd er o be ed w asso ed to	ntere the ater ciate the c	ed the close in the close	sure of ne levent pland so n lines	two el sw seal of t	isolation vitch and steam of he MFF	on valve d indica drain va PT cond	ted a lves fa enser.	high iled	
pr le gl or Th	oproxonder oced vel so and so oen a	nser. Óp ures. Tl witch on steam le nd allow lowed st	D239 Eneration ne caus the gla vel. W ed glas eam to	ST, the se of th	nuallinis e al ste leve al ste jecte	y tripp vent v eam s el switc am to d into	ed the vas december of the dec	e react etermir n that ti tuated, irectly r rain flo	or ar ned to rappo two oute w fro	nd er o be ed w asso ed to om th	ntere the vater ociate the c	ed the close in the close decided the close th	sure of ne leve gland s n lines FPT a	two el sw seal of t nd c	isolation vitch and steam of he MFF reated	on valve d indica drain va PT cond a restric	ted a lves fa enser. ted flo	high iled w	
pr le gl op Th	oproxonder oced vel sy and so oen a ondition	nser. Óp ures. Ti witch on steam le nd allow lowed st on beca	D239 E peration the gla vel. W ed glan eam to use of t	ST, the se of the second secon	nuall; his e al ste al ste jecte eam l	y tripp vent veam sel switch am to d into bound	ed the vas decorate vas decorate value of the decorate value of th	e react etermir n that ti tuated, irectly r rain flo ronmer	or ar ned to rappo two route w fro nt an	nd er o be ed w asso ed to om th d sul	ntere the vater ociate the cone 2A bseq	ed the close in the close decided the close deci	sure of ne leve gland s n lines FPT a ntly cha	two el sw seal of t nd c aller	isolation vitch and steam of he MFF reated iged the	on valve d indica drain va PT cond a restric e drain c	ted a lves fa enser. ted flo apabi	high ailed w lity (
pr le gl or Th co th	oproxonder oced vel sv and so oen a nis all ondition	nser. Óp ures. Ti witch on steam le nd allow lowed st on beca MFPT o	D239 E peration the gla vel. W ed glan eam to use of to ondens	ST, the se of the second secon	nuallinis e le leve al ste jecte eam	y trippy vent vent vent vent switch switch am to dinto bound pot car	ed the vas department of the d	e react etermin that to tuated, irectly r rain flo ronmer f this e	or ar ned to rappo two route w fro nt and vent	nd er o be ed w asso d to om th d sul was	ntere the vater ociate the c ne 2A bseq	ed the close in the close decided the close deci	sure of ne leven pland so n lines FPT a ntly cha ined to	two el sw seal of t nd c aller be	isolation isteam of the MFF reated and the deficient is a deficien	on valve d indica drain va PT cond a restric e drain o ency in	ted a lves fa enser. ted flo apabi enford	high ailed w lity c sing	of
pr le gl op Ti co th pr	oproxonder roced vel sv and soen a nis all ondition e 2A roper	nser. Op ures. The witch on steam le nd allow lowed st on becan MFPT of standar	D239 E peration ne caus the gla vel. W ed glas eam to use of t ondens ds for s	ST, the second s	nuallinis e la ste la ste lecte jecte eam he ro	y trippy vent veam sel switch am to dinto bound out carroll dur	ed the vas de ystem chack be did the d	e react etermin that to tuated, irectly r rain flo ronmer f this e rork de	or ar ned to rappe two oute w fro nt and vent velor	nd er o be ed w asso ed to om th d sul was omer	ntere the vater the cone 24 bseq tdete	ed the close in the close of th	sure of ne leve gland s n lines FPT a ntly cha ined to xecution	two el sw seal of t nd c aller o be on.	isolation isteam of the MFF reated and deficition contracts.	on valve on valve dindica drain va off cond a restrice drain off ency in ive action	ted a lves fa enser. ted flo apabi enford ons ind	high hiled w lity c cing clud	of
pr le gl op Th co th pr re	oproxonder oced vel sy and so ondition e 2A oper evising	nser. Op ures. The witch on steam le and allow lowed st on becan MFPT of standar g the wo	D239 Eneration the cause the glaued with the g	ST, the second s	nuallinus esal stelle lecterial stellecterial stellecteria	y trippy vent vent vent vent vent switch sam to dinto bound oot carrol dures proc	ed the vas dependent of the dependent of	e react etermin that to tuated, irectly r rain flo ronmer f this e vork de e to stre	or ar ned to rappe two oute w fro to vent velor velor	nd er o be ed w asso om th d sul was omer nen s	ntere the dater the cone 24 bseq to dete	ed the close in the close of th	sure of ne leve gland s n lines FPT a ntly cha ined to xecution	two el sw seal of t nd c aller o be on.	isolation isteam of the MFF reated and deficition contracts.	on valve on valve dindica drain va off cond a restrice drain off ency in ive action	ted a lves fa enser. ted flo apabi enford ons ind	high hiled w lity c cing clud	of
pr le gl op Th co th pr re	oproxonder oced vel sy and so ondition e 2A oper evising	nser. Op ures. The witch on steam le nd allow lowed st on becan MFPT of standar	D239 Eneration the cause the glaued with the g	ST, the second s	nuallinus esal stelle lecterial stellecterial stellecteria	y trippy vent vent vent vent vent switch sam to dinto bound oot carrol dures proc	ed the vas dependent of the dependent of	e react etermin that to tuated, irectly r rain flo ronmer f this e vork de e to stre	or ar ned to rappe two oute w fro to vent velor velor	nd er o be ed w asso om th d sul was omer nen s	ntere the dater the cone 24 bseq to dete	ed the close in the close of th	sure of ne leve gland s n lines FPT a ntly cha ined to xecution	two el sw seal of t nd c aller o be on.	isolation isteam of the MFF reated and deficition contracts.	on valve on valve dindica drain va off cond a restrice drain off ency in ive action	ted a lves fa enser. ted flo apabi enford ons ind	high hiled w lity c cing clud	of
pr le gl op Th co th pr re	oproxonder oced vel sy and so ondition e 2A oper evising	nser. Op ures. The witch on steam le and allow lowed st on becan MFPT of standar g the wo	D239 Eneration the cause the glaued with the g	ST, the second s	nuallinus esal stelle lecterial stellecterial stellecteria	y trippy vent vent vent vent vent switch sam to dinto bound oot carrol dures proc	ed the vas dependent of the dependent of	e react etermin that to tuated, irectly r rain flo ronmer f this e vork de e to stre	or ar ned to rappe two oute w fro to vent velor velor	nd er o be ed w asso om th d sul was omer nen s	ntere the dater the cone 24 bseq to dete	ed the close in the close of th	sure of ne leve gland s n lines FPT a ntly cha ined to xecution	two el sw seal of t nd c aller o be on.	isolation isteam of the MFF reated and deficition contracts.	on valve on valve dindica drain va off cond a restrice drain off ency in ive action	ted a lves fa enser. ted flo apabi enford ons ind	high hiled w lity c cing clud	of

NRC FORM 366A (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

1	1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
	Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER	REVISION	2 OF 5
**			2009 002 00		;	

^{17.} NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

I. PLANT CONDITION(S)

Unit 2 was operating at approximately 30 percent power during power ascension following the Unit 2 Cycle 16 refueling outage.

II. DESCRIPTION OF EVENT

A. Event:

On November 26, 2009, at 0242 Eastern standard time (EST), SQN Unit 2 reactor was manually tripped following an indication of degrading main feedwater pump turbine (MFPT) condenser [EIIS Code SG] vacuum. At approximately 0239 EST, the shift manager was notified of indications of a degrading vacuum in the 2A MFPT condenser. At approximately 0242, the 2A MFPT condenser indicated positive pressure with a corresponding condensate saturation temperature. Based on indications of positive pressure in the 2A MFPT condenser and degrading vacuum in the 2B MFPT condenser, a reactor trip was directed by the shift manager. Operations personnel entered the applicable emergency procedures.

B. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

C. Dates and Approximate Times of Major Occurrences:

Date

Description

November 26, 2009, at 0239 EST

The Operations shift manager was notified of indications of degrading vacuum in the 2A MFPT condenser. This

condition was followed by indications of a degrading

vacuum in the 2B MFPT condenser.

November 26, 2009, at 0242 EST

Operations initiated a manual reactor trip and entered

at 0242 EST emergency operation procedures.

D. Other Systems or Secondary Functions Affected:

No other systems or secondary functions were affected by this event.

LICENSEE EVENT REPORT (LER)

	1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
	Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER :	REVISION	3 OF 5
1			2009 -	- 002	00	

^{17.} NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

E. Method of Discovery:

On November 26, 2009, at approximately 0239 EST, the Operations unit supervisor notified the shift manager of degrading vacuum in the 2A MFPT condenser.

F. Operator Actions:

Based on a positive pressure in the 2A MFPT condenser and a degrading vacuum in the 2B MFPT condenser, a reactor trip was directed by the shift manager.

G. Safety System Responses:

The safety systems performed as designed for the reactor trip. Auxiliary feedwater [EIIS Code BA] automatically initiated following the reactor trip. At approximately seven minutes after the trip, flow was reduced to mitigate the decrease in reactor coolant system average temperature and recover steam generator levels. All safety systems remained within technical specifications (TS) and Updated Final Safety Analysis Report (UFSAR) limits.

III. CAUSE OF THE EVENT

A. Immediate Cause:

The immediate cause of this event was failure to properly implement procedure use and adherence. This resulted in an incorrect valve configuration for the gland seal steam level switch.

B. Root Cause:

The root cause of this event was determined to be a deficiency in enforcing proper standards for status control during work package development and execution. A technically inaccurate preventative maintenance procedure caused a valve configuration control problem with the associated work package. If proper standards concerning status control had been understood and executed during work package development and execution, the procedure would have been corrected and the event would not have occurred.

C. Contributing Factor:

Plant personnel failed to utilize proper procedure use and adherence fundamentals.

(9-2007)

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL NUMBER	REVISION	4 OF 5
		2009 -	002 00		

^{17.} NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

IV. ANALYSIS OF THE EVENT

Unit 2 was operating in Mode 1 at approximately 30 percent power during power ascension following the Unit 2 Cycle 16 refueling outage. Prior to the event, the reactor coolant system (RCS) [EIIS Code AB] pressure was approximately 2235 pounds per square inch gauge (psig). Following the reactor trip, RCS pressure rapidly decreased because of the decreasing RCS average temperature and the associated shrinking of coolant volume. The minimum RCS pressure following the trip was approximately 2168 psig, which is well above the pressure that would have initiated a safety injection signal. The RCS temperature following the trip remained within TS limits. The minimum pressurizer level following the reactor trip was approximately 19 percent, above the level of the pressurizer heaters. The plant response was expected because of the low initial power level and low decay heat as the plant was in power ascension from a refueling outage. No TS limits were exceeded and the UFSAR analysis of this event remained bounding.

V. ASSESSMENT OF SAFETY CONSEQUENCES

Based on the above "Analysis of The Event," this event did not adversely affect the health and safety of plant personnel or the general public.

VI. CORRECTIVE ACTIONS

A. Immediate Corrective Actions:

Corrective actions included opening the two closed isolation valves for the level switch on the gland seal steam system and performing an extent of condition walkdown of valves on selected systems to verify proper valve positioning.

B. Corrective Actions to Prevent Recurrence: The corrective actions are being managed by the Sequoyah Nuclear Plant Corrective Action Program.

Revise the procedure that governs status control to strengthen requirements such that planning and the review process assures that status control is adhered to in work packages. Develop and implement additional personnel training for procedures that govern work package development and expectations regarding status control.

(9-2007)

LICENSEE EVENT REPORT (LER)

	1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
1	Sequoyah Nuclear Plant (SQN) Unit 2	05000328	YEAR	SEQUENTIAL 'NUMBER 1	REVISION	5 OF 5
			2009 002 00			

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

VII. ADDITIONAL INFORMATION

A. Failed Components:

None.

B. Previous LERs on Similar Events:

A review of previous reportable events within the last three years did not identify any previous similar events.

C. Additional Information:

None.

D. Safety System Functional Failure:

This event did not result in a safety system functional failure in accordance with 10 CFR 50.73(a)(2)(v).

E. Unplanned Scram with Complications:

This condition did not result in an unplanned scram with complications.

VIII. COMMITMENTS

None.